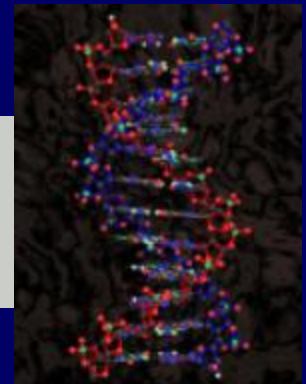




# OEHHA-COEH Workshop Oct 1-2, 2007 Sacramento, CA

## *Barriers to using new screening tools*

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# Center for Occupational and Environmental Health

Est. 1978 (AB 3414)



Berkeley, Davis, San Francisco (northern California).

- Toxicology
- Epidemiology
- Industrial hygiene
- Environmental health policy
- Occupational & environmental medicine
- Occupational nursing
- Ergonomics
- Labor education
- Professional education



*Green Chemistry in  
California:  
A Framework for  
Leadership in  
Chemicals Policy and  
Innovation.*

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Published March 2006

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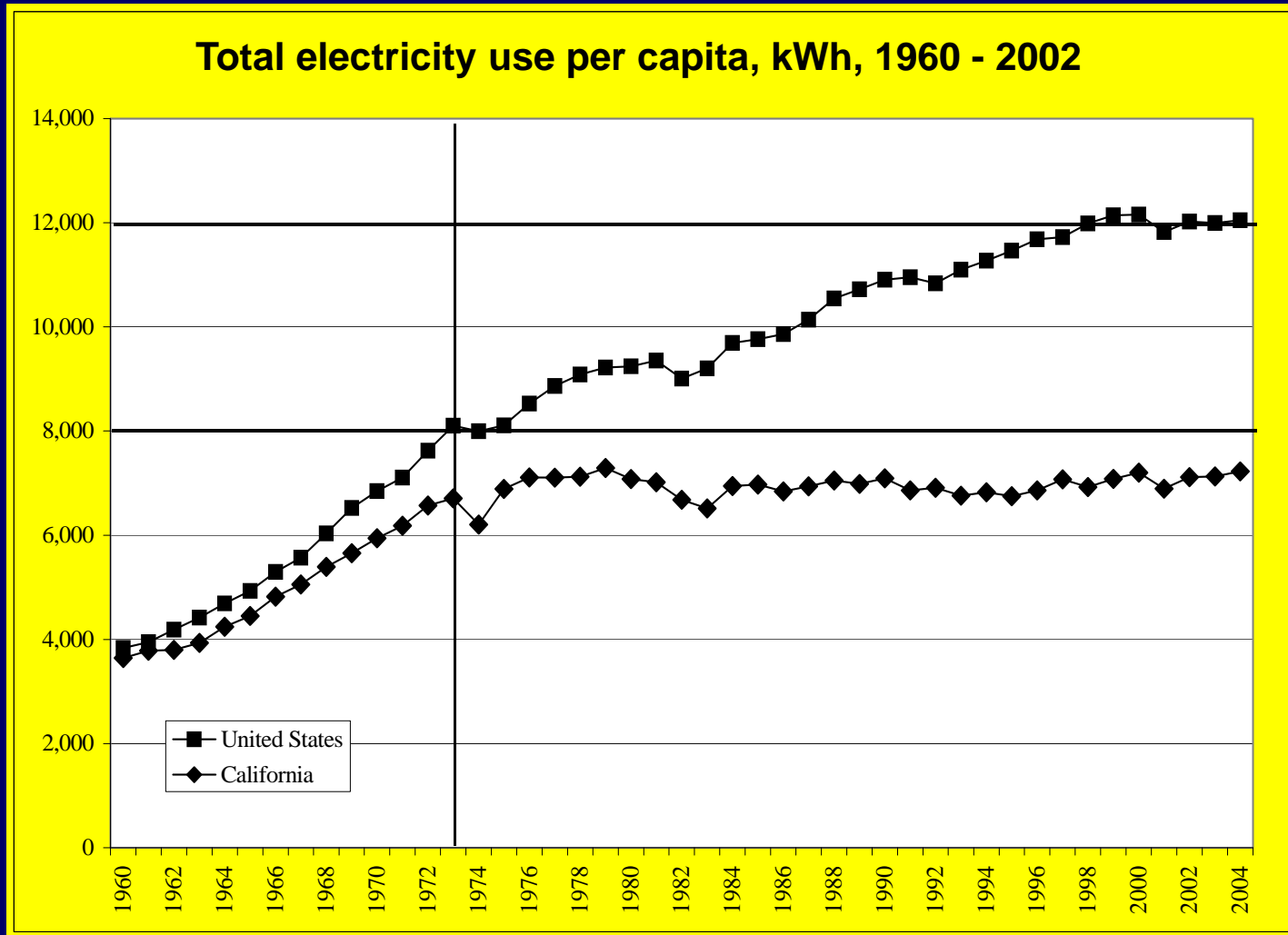
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A multi-pronged, long-term approach has produced substantive changes in the energy sector.

Can a similar claim be made for the chemical sector? Why not?



Courtesy John Wilson, CA Energy Commission

# Barrier 1: No baseline data...& no way to measure progress.

In California, we do not know:

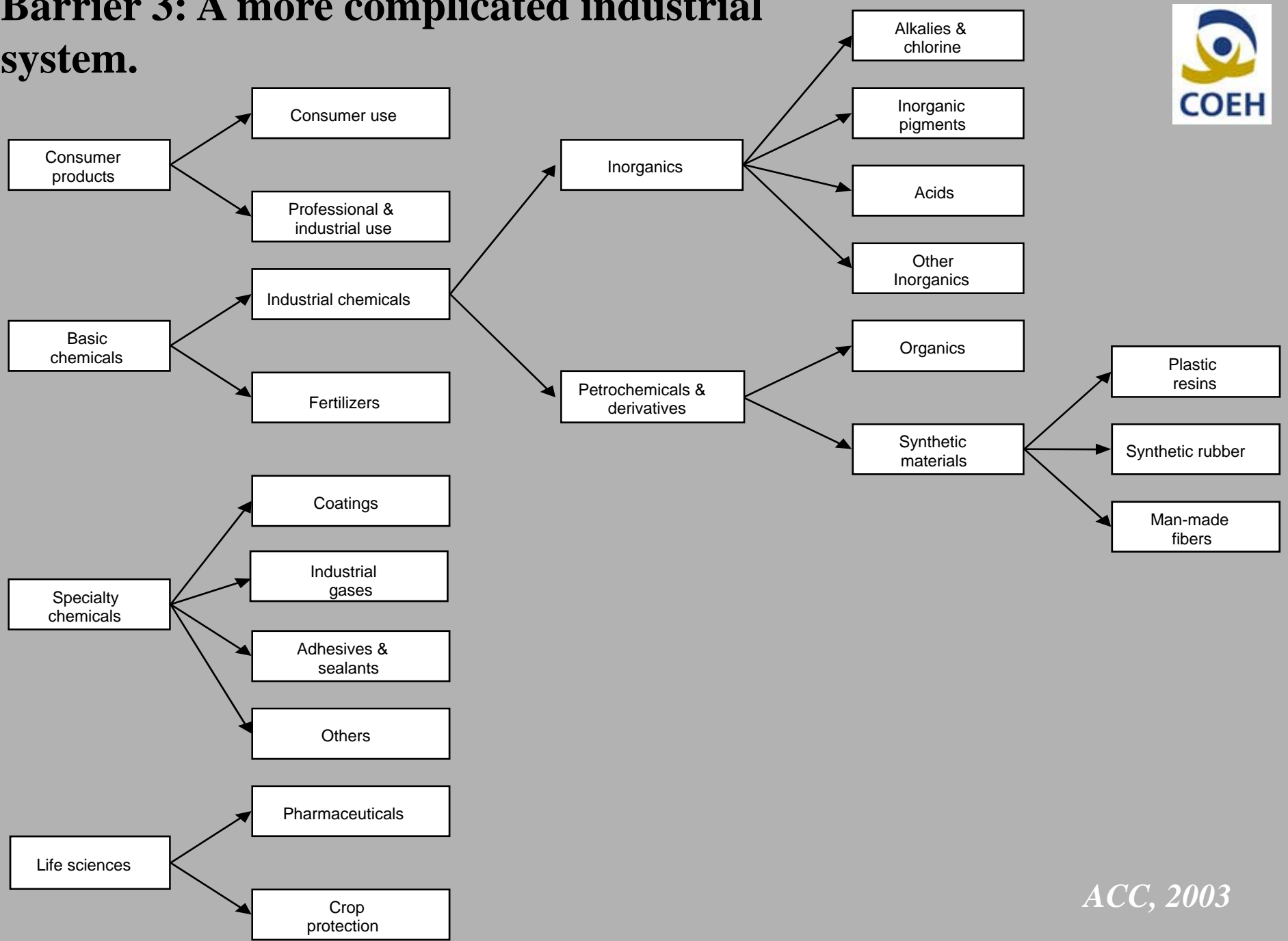
- Exposure
  - Identity of chemical substances sold, or...
  - where they are used...
  - for what purpose...
  - in what volume...
  - where they “end up” & in what form...
  - key exposure points in the lifecycle.
- Hazard
  - How toxic or ecotoxic they are, or...
  - how persistent and bioaccumulative they are.
- Risk
  - In what ways workers, children, communities are at risk.

## Barrier 2: No agreed-upon set of metrics to measure baseline data.

Can screening tools be used to adequately characterize:

- Exposure
  - Low, medium, high?
- Hazard
  - Low, medium, high toxicity, ecotoxicity, persistence, bioaccumulative potential?
- Risk
  - Low, medium, high?

# Barrier 3: A more complicated industrial system.





Barrier 4: An enormous industrial sector, with “silo” of gov & academia.

- Total daily U.S. chemical production and importation:  
= 42 billion pounds (623,000 tankers) (TSCA IUR).
- Total daily California sales of chemical products alone:  
= 644 million pounds (2,700 tankers) (CA ARB).





The workplace



Commercial products



Waste streams

Ecosystems: air, water,  
food, soil

Global trade

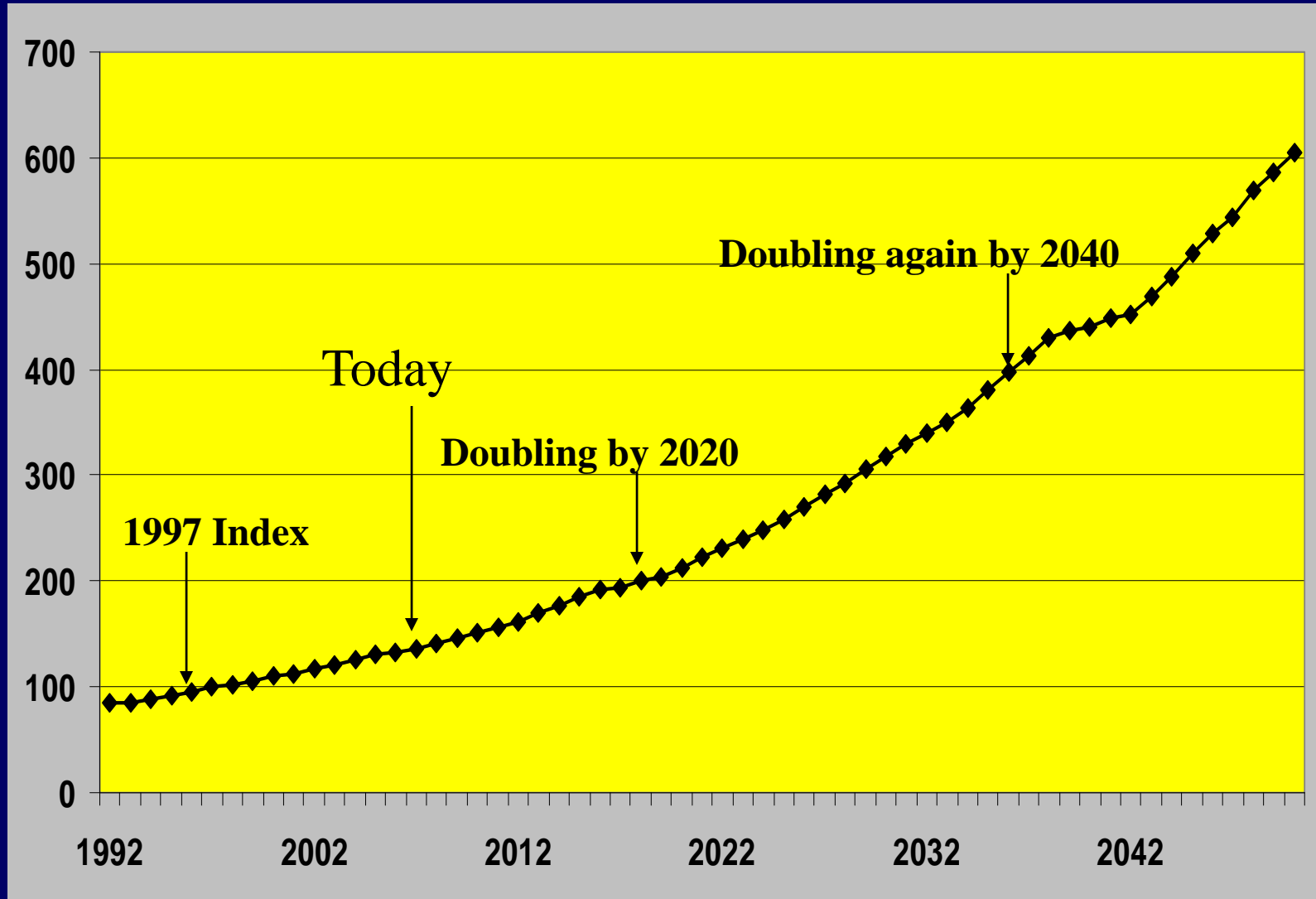


Barrier 5: Multiple “points of contact.”

## Barrier 6: Multiple health and environmental effects:

- Occupational diseases
  - Highly exposed communities
  - Fetal, infant, and childhood exposures
  - Endocrine disrupting substances
  - Neurotoxic substances
  - Bioaccumulative & persistent chemicals
- 
- Solid waste proliferation
  - Hazardous waste proliferation
  - Ocean plastics accumulation
  - Electronic waste

Meanwhile...at a growth rate of 3% per year, global chemical production doubles every 25 years (*OECD, ACC, UKCIA*)





**U.S. EPA: On current trajectory, we will need 600 new hazardous waste sites each month of each year up to 2033.**

**Graphic arts courtesy Chris Jordan ([chrisjordan.com](http://chrisjordan.com))**











**426,000: the number of cell phones retired each day in the U.S.**





75% of U.S. electronic waste goes to Asian countries.  
Lianjiang River, Guiyu, China *Photos: Basel Action Network*

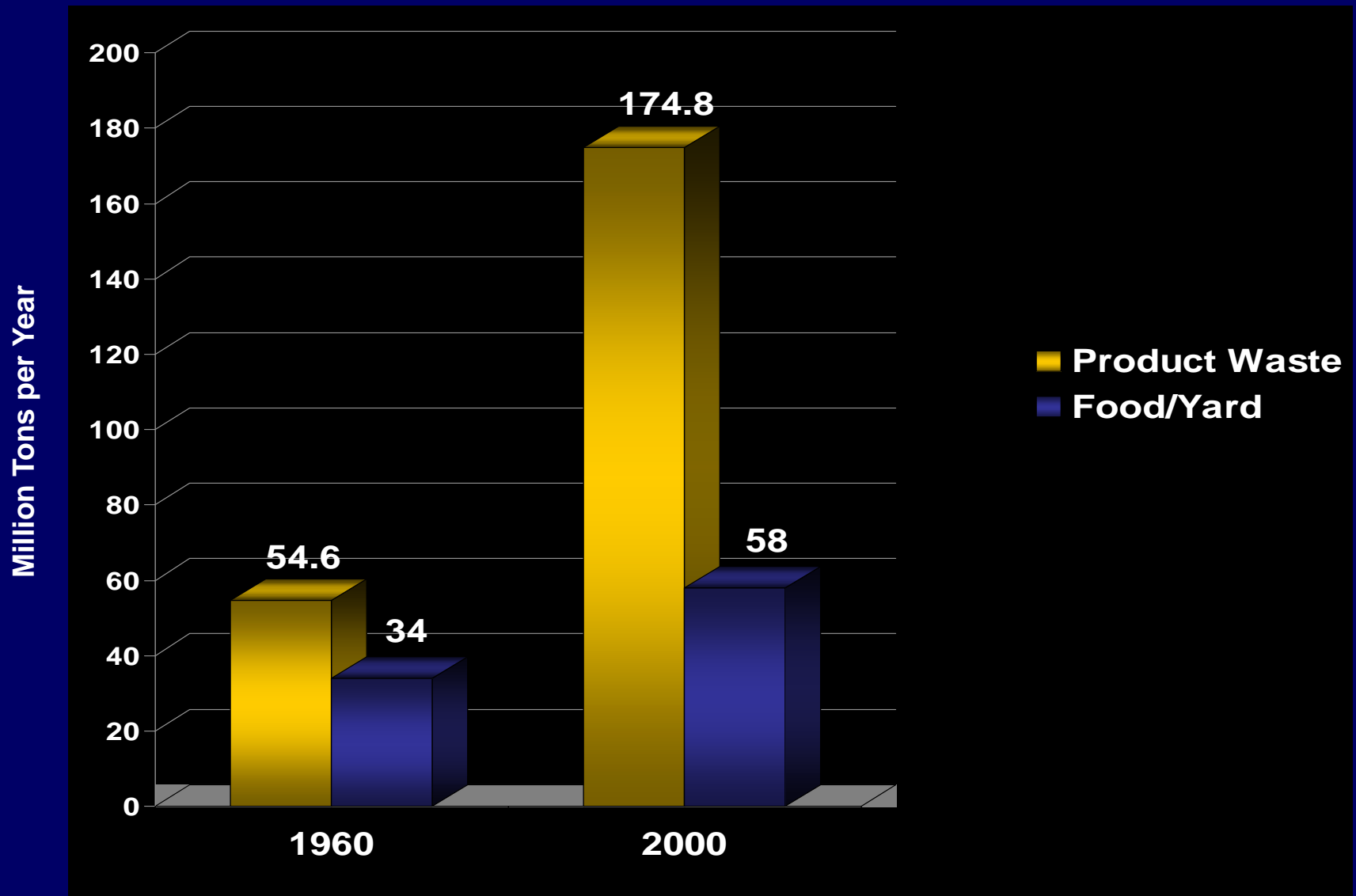




50 million tons of e-waste are discarded annually  
(5% of global solid waste) Guiyu, China

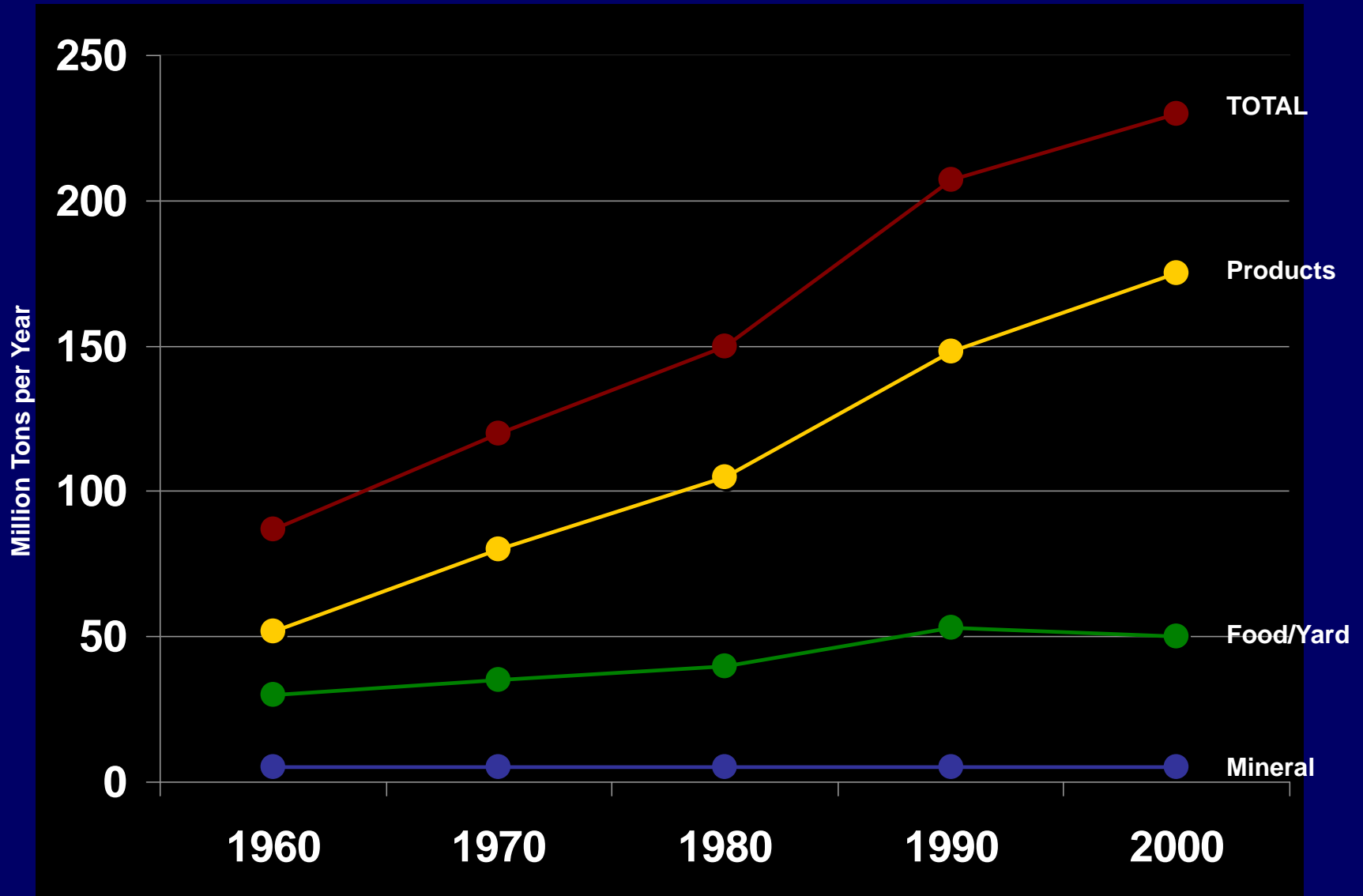


# Changing Waste





# Changing Waste



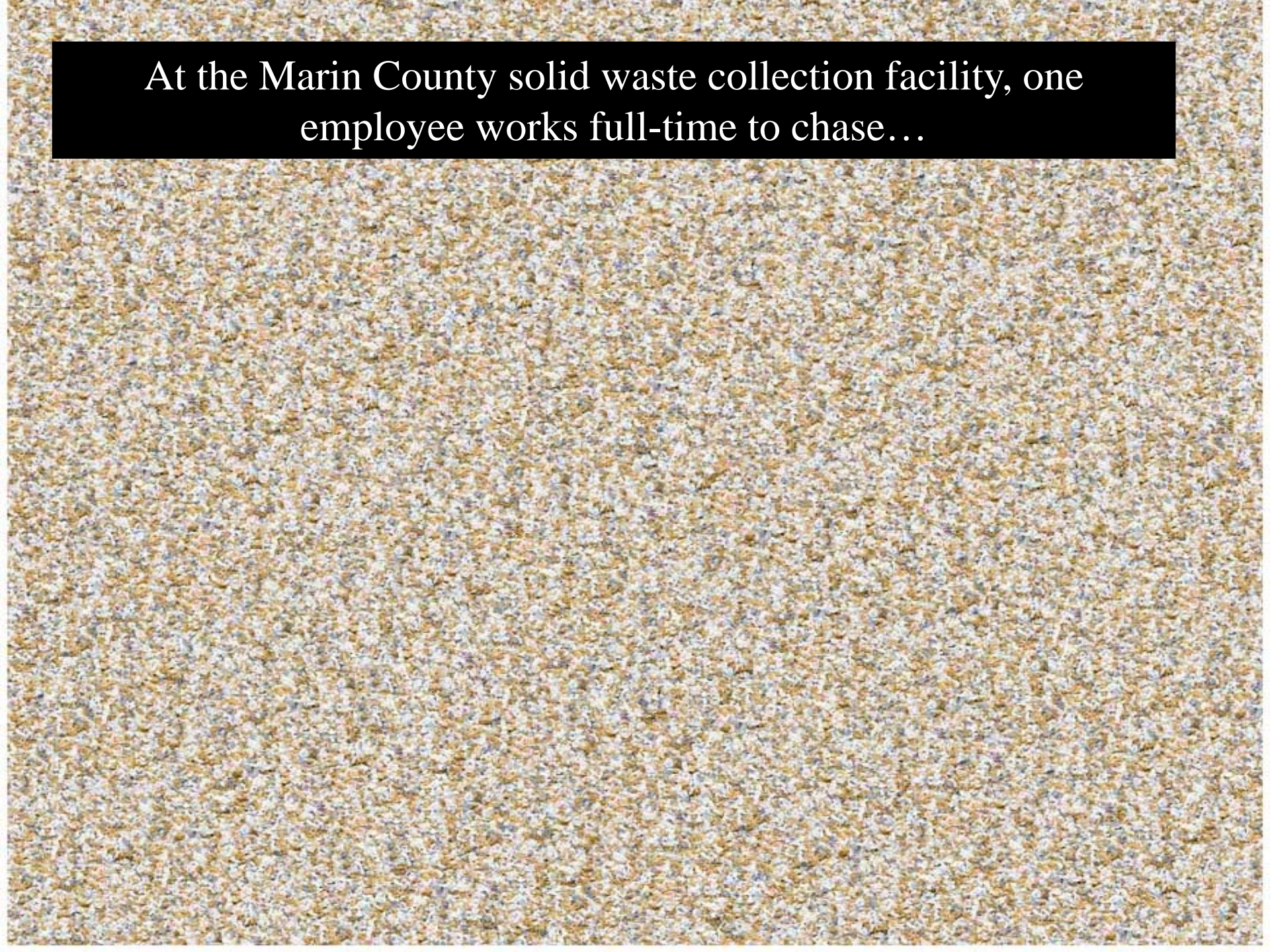


**Combined, there are an estimated 23,000 new cases of occupational cancer and COPD in California each year, with 6,500 deaths.**





At the Marin County solid waste collection facility, one employee works full-time to chase...









...plastic bags, preventing them from blowing into wetlands.







**60,000: the number of plastic bags used every 5 secs in the U.S.**



In the Texas-sized Pacific Gyre, plastic particles outweigh phytoplankton 6:1.

In ten years, a ratio of 60:1 is expected.

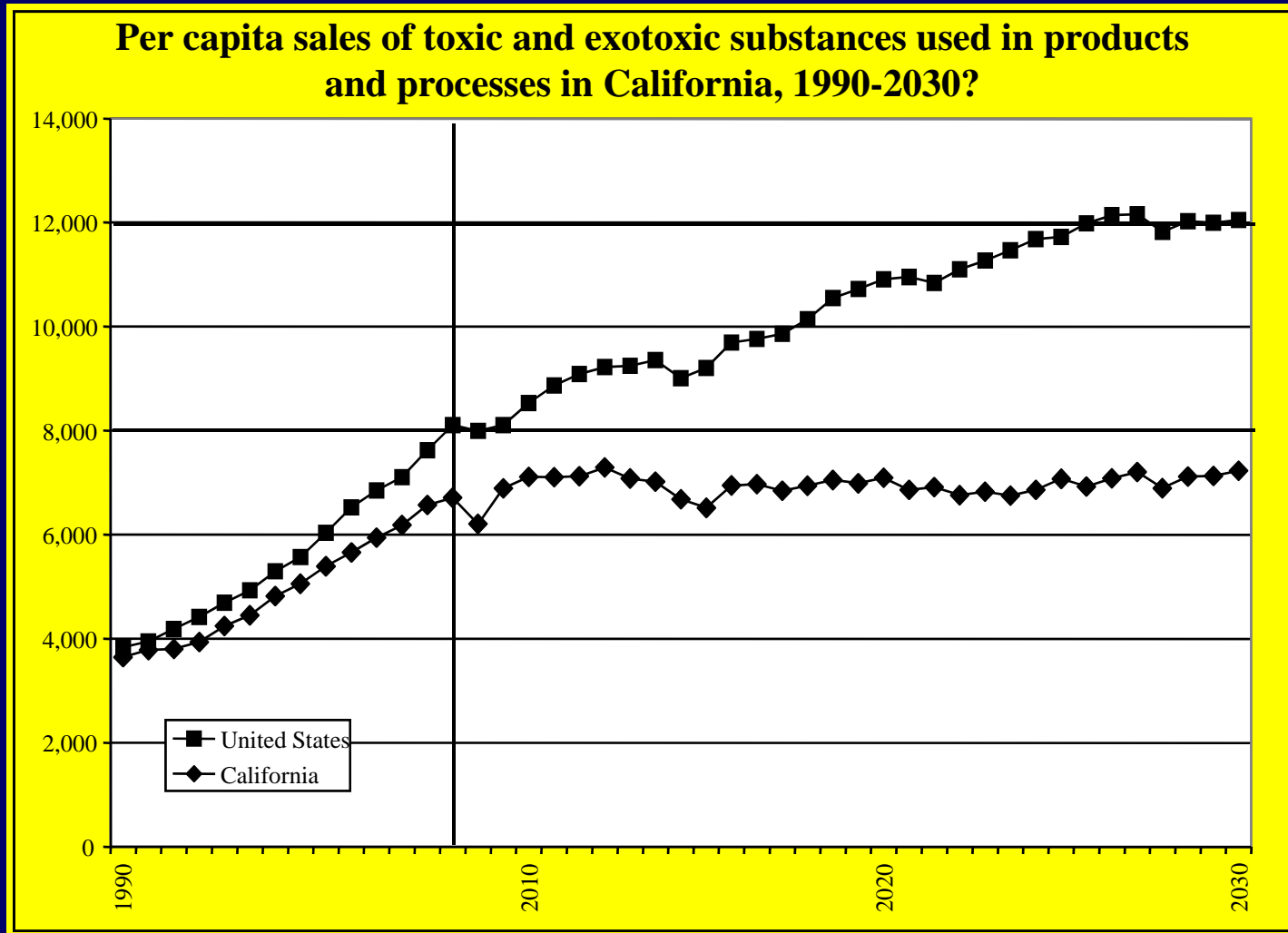
## Barrier 7: Cognitive dissonance?



The LA River

Courtesy Algalita Foundation

We need a more sustainable approach to the design and use of chemicals, materials, and products; one that sets a new direction.



# Three ways the federal Toxic Substances Control Act of 1976 stands in our way:

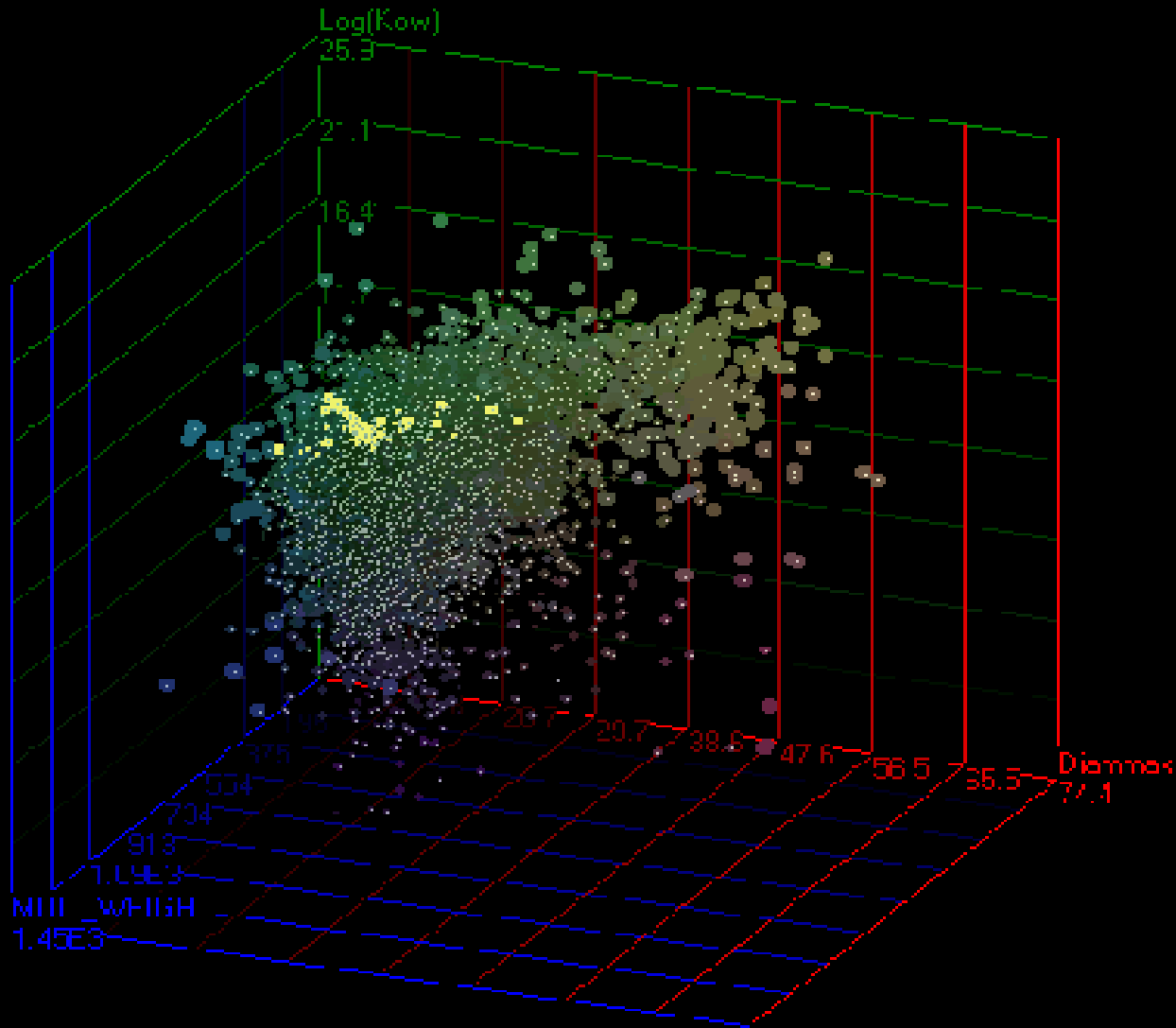


- **Data Gap**
  - (Transparency)
- **Safety Gap**
  - (Accountability)
- **Technology Gap**
  - (Innovation)



- Data Gap is key to robust screening tools:
  - 62,000 pre-1979 substances: no data requirements
  - 20,000 post-1979 substances: action by EPA on 3,500 = 10% proposed for commercial use.
  - Of information filings for post-1979 chemicals:
    - 67% contained no test data
    - 85% contained no toxicity data
    - 95% contained no ecotoxicity data

# Example: EPA's data on estrogen-binding activity for existing chemicals in the TSCA inventory.





Data Gap is key to new markets.

; To make informed purchasing decisions about chemicals, buyers need four pieces of information:

<b>Function</b>	<b>Price</b>
<b>Performance</b>	<b>Hazards</b>





How buyers operate in  
the chemicals market  
under TSCA:

Function	Price
Performance	





To assess & prioritize chemical hazards, state agencies need at least four pieces of information:



<b>Identity</b>	<b>Sales volume</b>
<b>Uses</b>	<b>Hazards</b>



Information available to state agencies under TSCA:

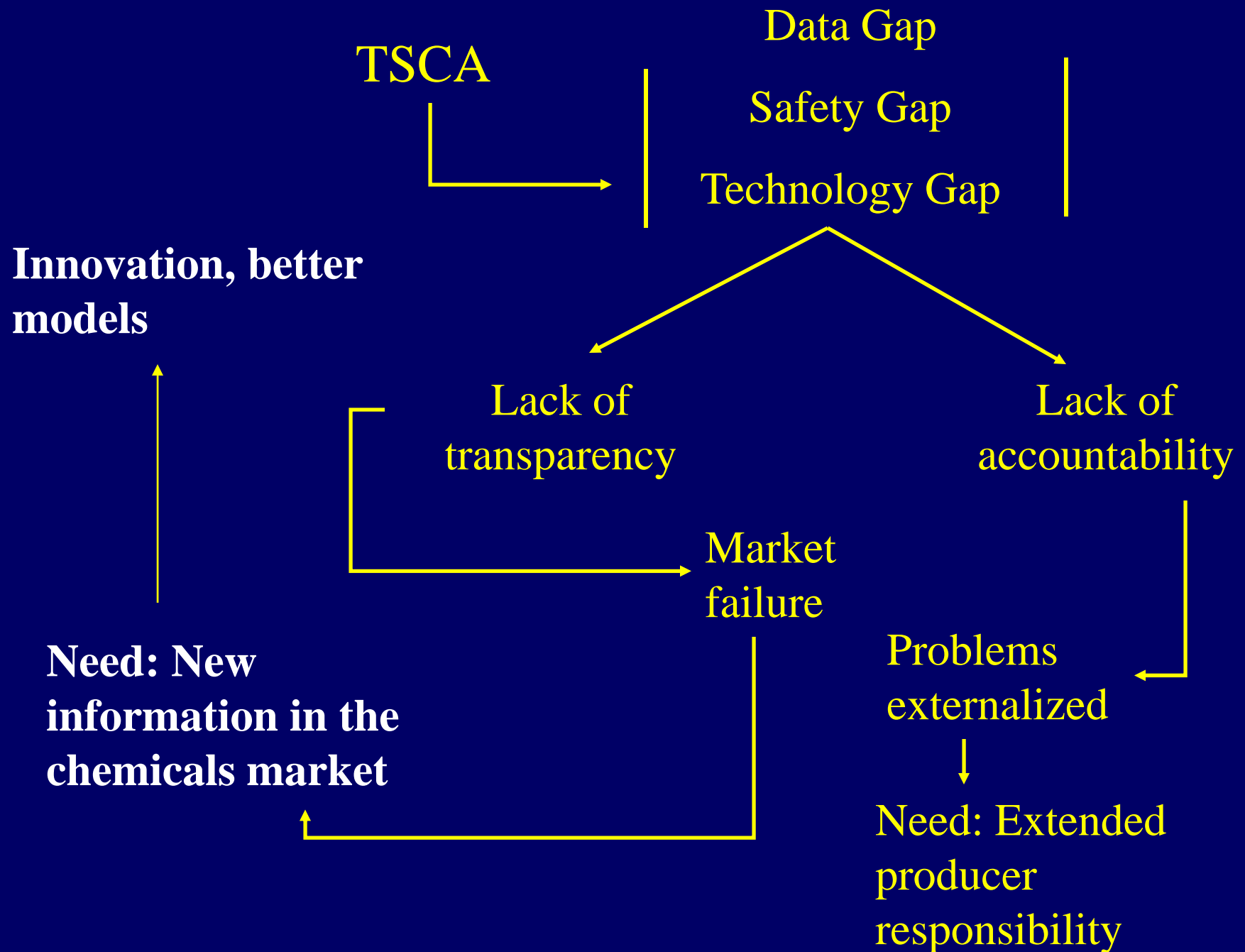



Sather gate, UC Berkeley

Reflecting the chemicals market under TSCA...

The chemistry curriculum does not require an understanding of:

- toxicology
- ecotoxicology
- exposure
- principles of green chemistry.



Many reports have described these problems.  
What is different today?

- National Academy of Sciences 1984
- U.S. General Accounting Office 1994
- Congressional Office of Technology Assessment 1995
- Environmental Defense 1997
- U.S. EPA 1998
- former EPA officials 2002
- RAND Science and Technology Institute 2003
- U.S. Government Accountability Office 2005
- National Academy of Sciences 2005
- University of California 2006
- U.S. Government Accountability Office 2007

**The E.U. and U.S. have the same problems with lack of transparency and accountability; E.U. is acting.**

- 
- A world map with a circular callout around Europe and an arrow pointing to the United States. The map shows major countries and oceans. The callout circle is centered over Europe, and an arrow points from it to the United States. The text is overlaid on the map.
- **Cosmetics Directive: 2004**
  - **Waste in Electrical and Electronic Equipment (WEEE): 2005**
  - **Restriction on Hazardous Substances (RoHS): 2006**
  - **Registration, Evaluation, Authorization of Chemicals (REACH): 2007**



**Through torrents of resistance, the  
E.U. pushes ahead...**



# *“G.E. Chief Points to ‘Green’ Handicap”*

Financial Times

May 10, 2005

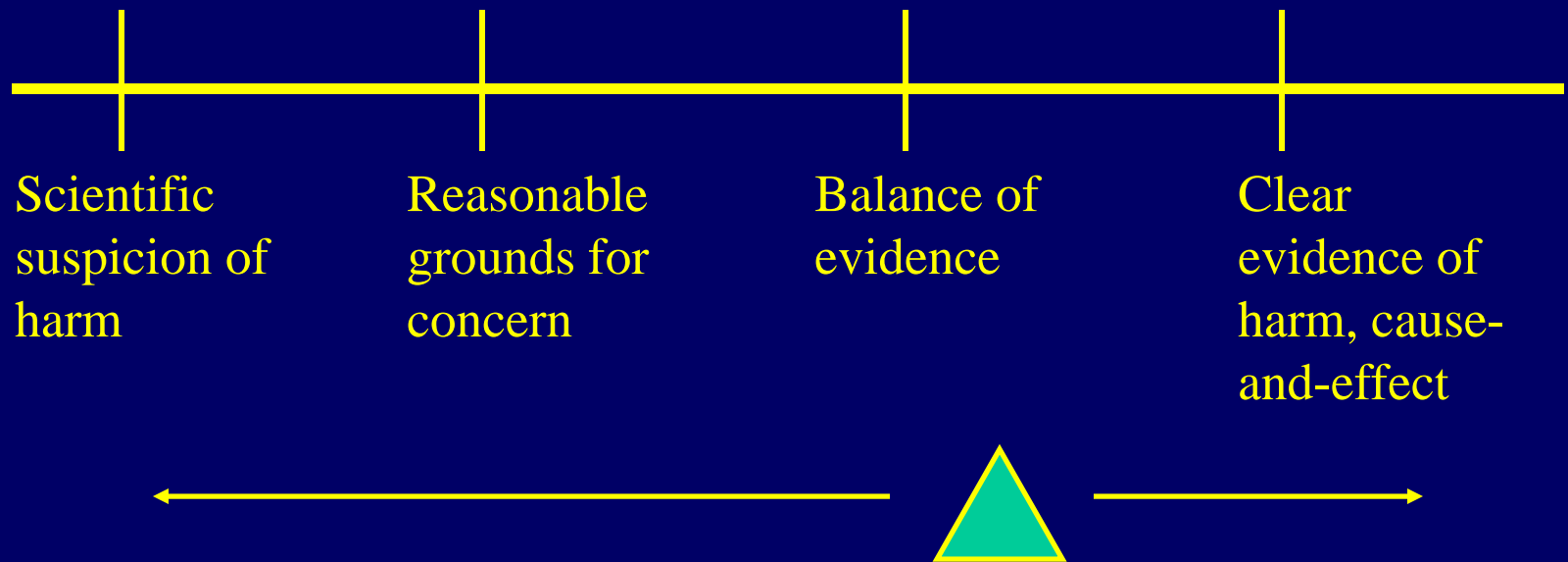
Stephanie Kirchgaessner in Washington

*“...the deregulatory agenda favored by the U.S. business community – particularly on environmental issues – is not providing American companies with a competitive advantage over their European counterparts.”*



Jeffrey Immelt, Chairman and CEO (\$1.5 billion/yr Ecomagination)

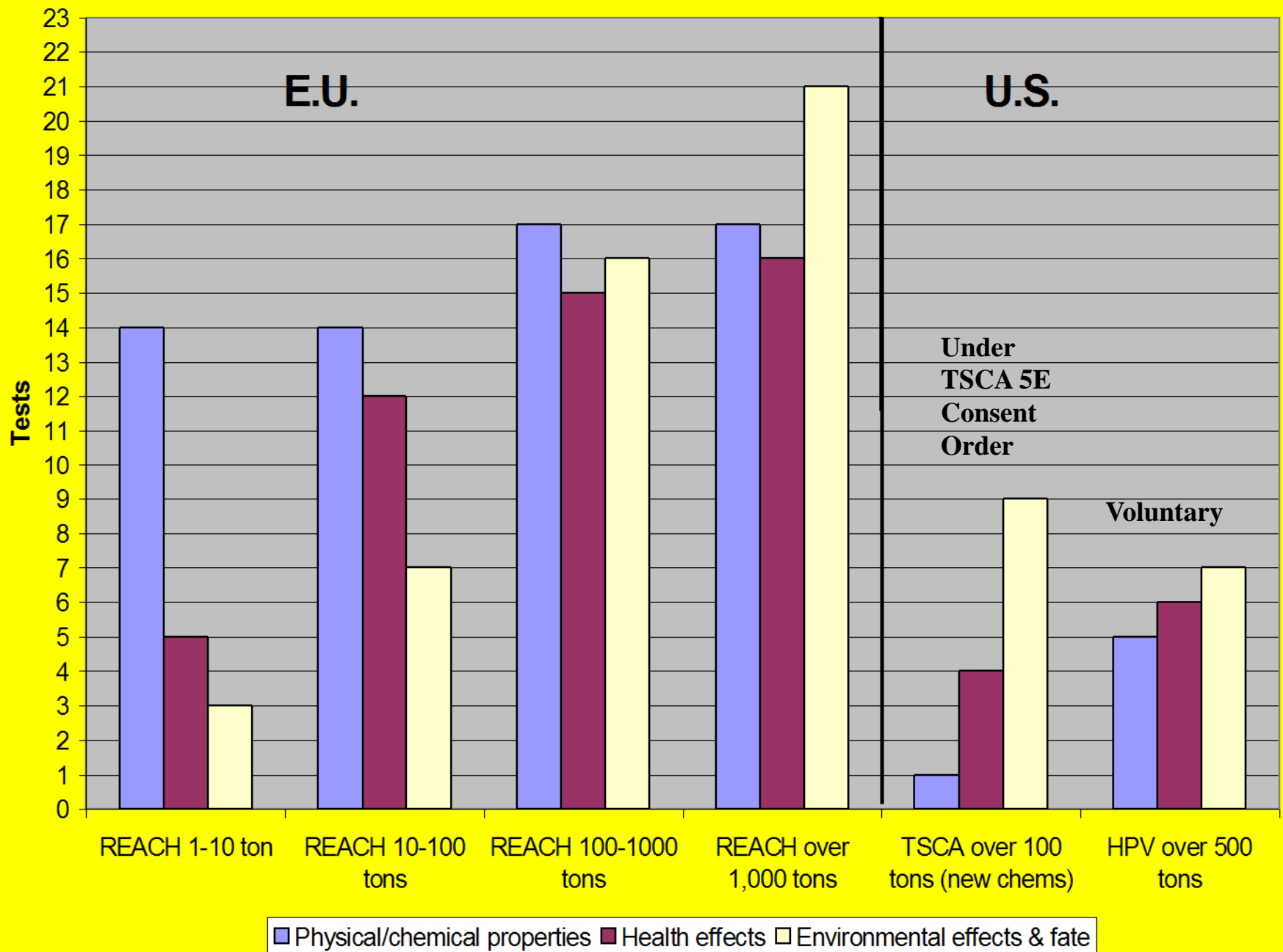




Recognizing the importance of early warnings allows decisions to be made, and action to be taken, not simply on “clear evidence of cause and effect”, but on “the balance of evidence”, or “reasonable grounds for concern”, or “scientific suspicion of risk.”

*Late Lessons to Early Warnings, 2001*

The Environment Commission of the  
European Union





**As other nations decide to follow an E.U. or U.S. model,  
there is a role for the U.S. scientific community.**



**E.U.**

**REACH, RoHS, WEEE:**

- **Transparency**
- **Accountability**
- **Precaution**

**U.S., Mexico, Canada**

**“Security and Prosperity  
Partnership:”**

- **Voluntary**
- **No transparency or  
accountability measures**



# ***California Leadership on Chemicals Policy:***



- ***The California Green Chemistry Initiative***
- ***California Senate and Assembly Bills***
- ***Downstream Users***
- ***Investors***
- ***Californians for a Healthy and Green Economy (CHANGE)***
- ***Environmental Health Legislative Working Group***
- ***The California Consortium on Green Chemistry***



## ***The California Consortium on Green Chemistry***

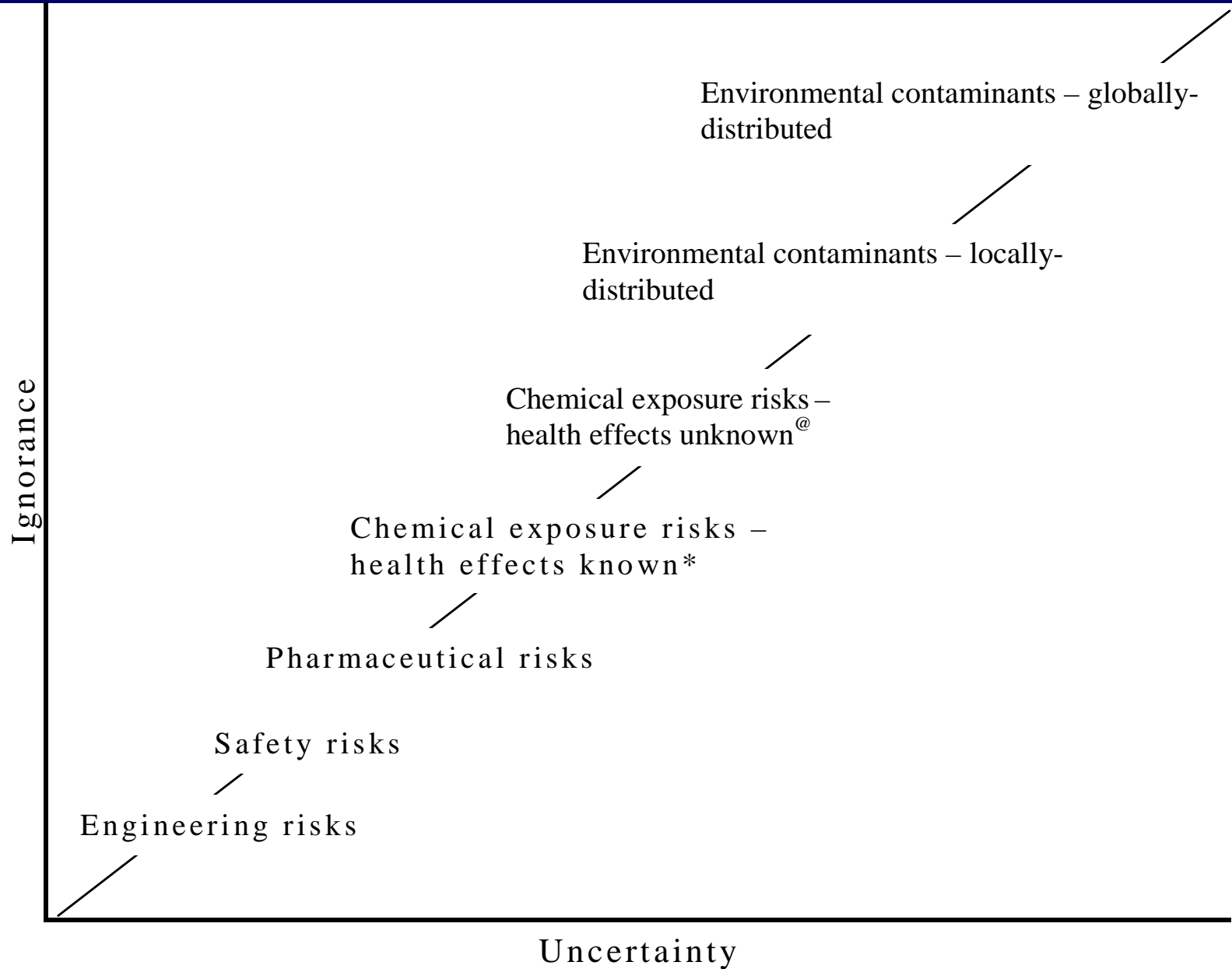
- The Consortium applies the resources of the University of California, Berkeley, in support of California stakeholders working to:
- Lead the nation in green chemistry and engineering through innovations in science and policy;
- Stimulate investment in California in the design and use of biologically benign materials and processes;
- Transform the market for chemicals and materials through information transparency and product stewardship;
- Advance public and environmental health through the scientific application of early indicators of harm.

# ***The California Consortium on Green Chemistry***



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***Thank you!***

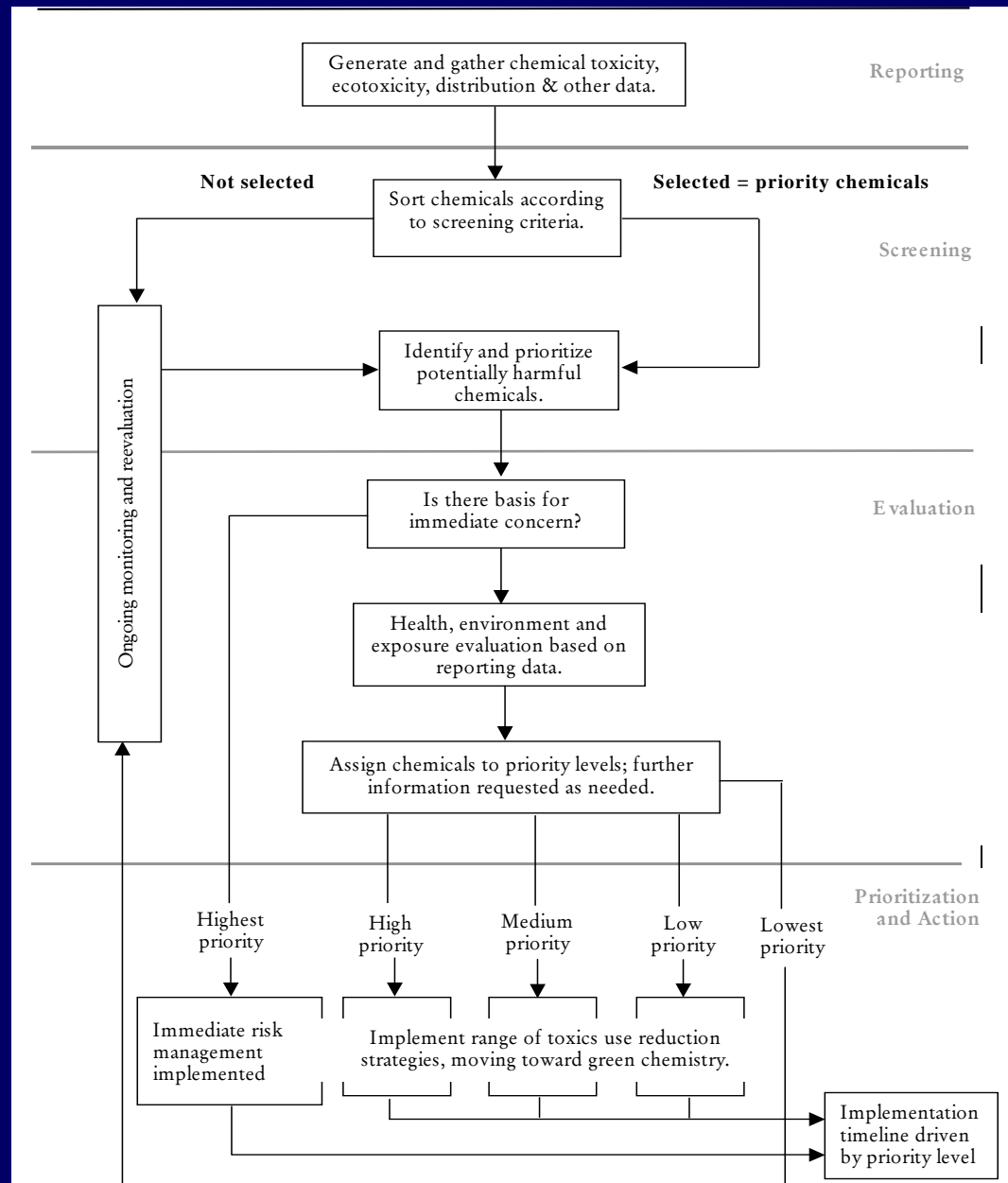


“Whilst accepting that even the broadest appraisal processes may still fail to foresee ‘surprises’, there is much that can be done to guard against some of the consequences of the ubiquitous experience of ignorance and surprise.”

European Science Technology Observatory, 2001



# Royal Commission on Environmental Pollution, June 2003



# Hansson & Ruden model for prioritizing chemicals on the basis of environmental persistence and bioaccumulation,

United Nations Environment Programme, 2004

